

# Novel Cryogenic Actuator Development

Completed Technology Project (2012 - 2014)



## Project Introduction

The goal of this IRAD is to design, manufacture, and test actuator drive components coated with new novel materials that have exceptionally strong hardness and low coefficient of friction properties for potential use in devices from room to cryogenic temperatures.

New thin film low friction coating technologies have recently been developed and matured to the point for use in this IRAD actuator work.

The new novel materials have exceptionally strong hardness and low coefficient of friction properties. The coatings have been applied to the actuator drive components.

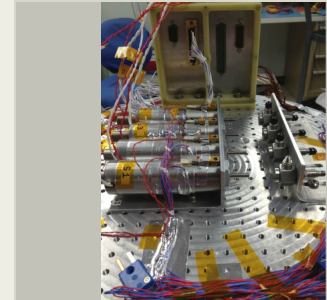
The next step in this project is the analysis of the performance and life tested for potential future space flight application, which is underway.

## Anticipated Benefits

The benefit to NASA would be to have a new technological capability for developing reliable, long life electromechanical actuators that can routinely operate from room to cryogenic temperatures for millions of cycles, far surpassing any present commercially available products for space flight use.

The same benefit exists here to NASA as for funded mission and would also include the potential cost savings of technology development on future missions that require long life actuators for deep space missions.

Presently, no known commercial aerospace actuator vendor in the US has the resources or capability to perform this work and no other known government agency is pursuing it. If successfully developed, there is potential for commercial technology transfer of this IRAD technology via SBIR or other equivalent methods for licensing purpose and future and other government agency use.



Solenoid

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Goddard Space Flight Center (GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

### Primary U.S. Work Locations

Maryland

## Organizational Responsibility

### Responsible Mission Directorate:

Mission Support Directorate (MSD)

### Lead Center / Facility:

Goddard Space Flight Center (GSFC)

### Responsible Program:

Center Independent Research & Development: GSFC IRAD

## Project Management

### Program Manager:

Peter M Hughes

### Project Manager:

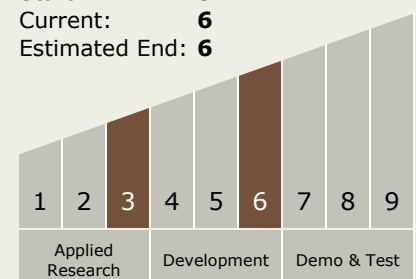
Theodore D Swanson

### Principal Investigator:

Rajeev Sharma

## Technology Maturity (TRL)

Start: 3  
Current: 6  
Estimated End: 6

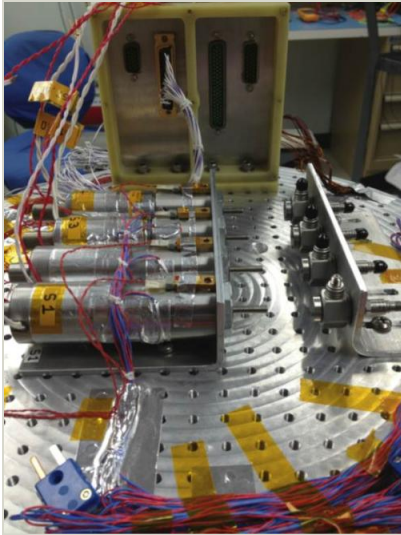


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## Images



### Novel Cryogenic Actuator Development Project

Solenoid

(<https://techport.nasa.gov/image/4024>)

### Project Website:

<http://aetd.gsfc.nasa.gov/>

## Technology Areas

### Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.3 Mechanical Systems
    - └ TX12.3.7 Mechanism Life Extension Systems